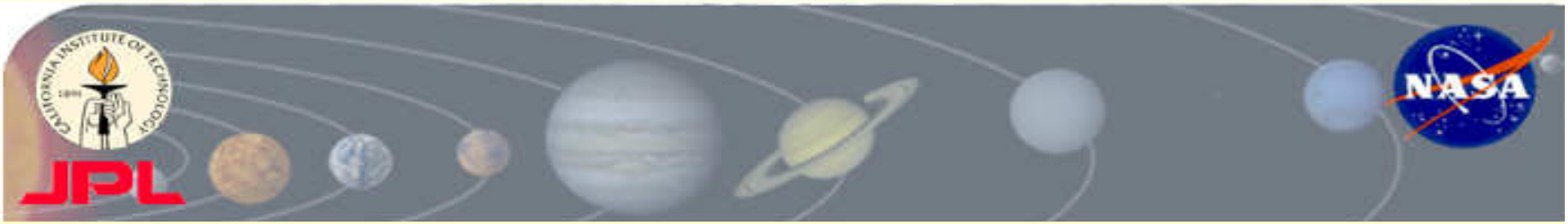


Doing Business with JPL

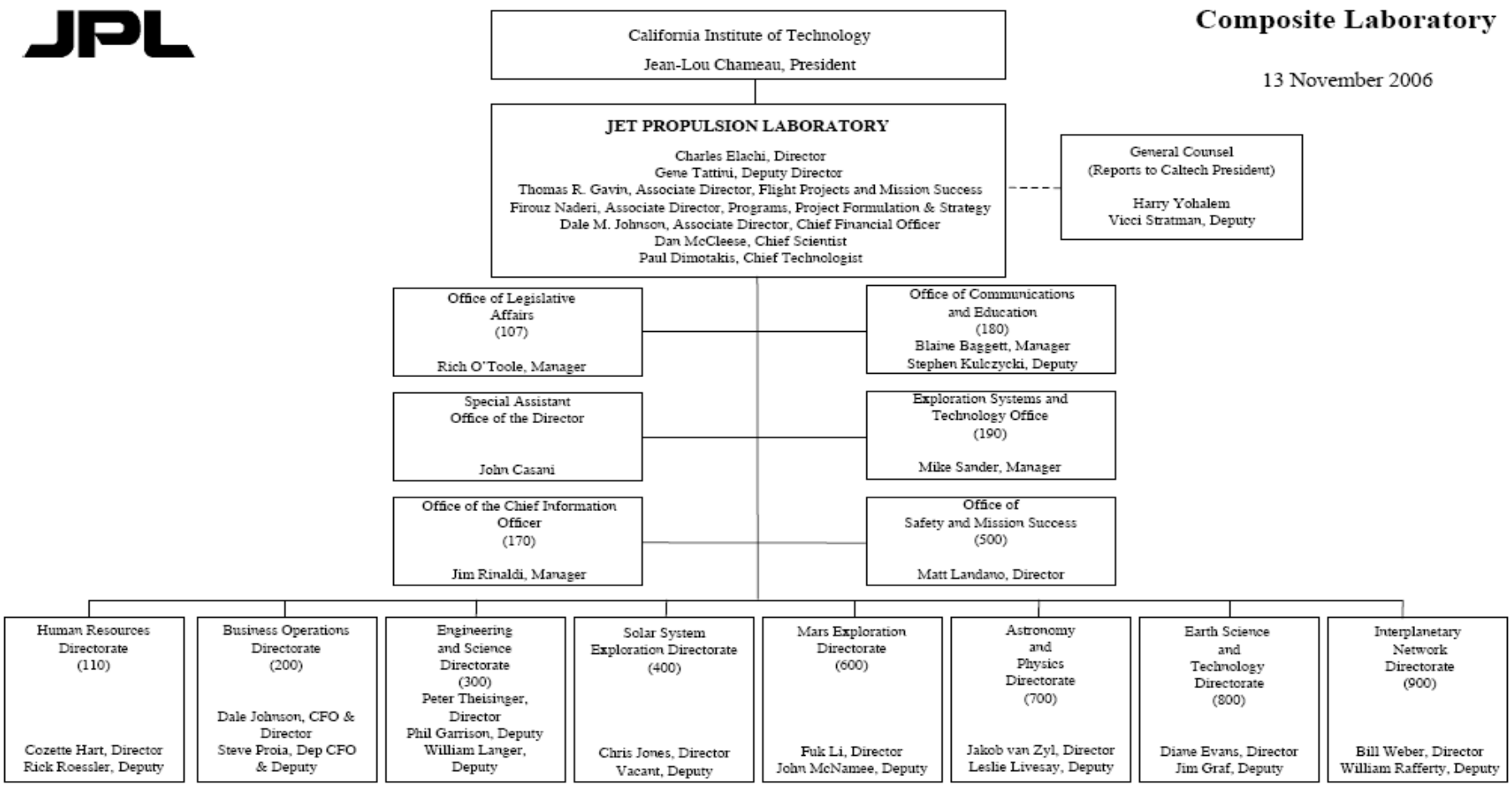
Kirk Bilby

March 6, 2007

Know your Customer

- Jet Propulsion Laboratory
- A Federally Funded Research & Development Center (FFRDC)
- Assigned to NASA (One of 10 centers)
- Operating Division Of Caltech (Edu. Institution)
- NASA’s lead center for Robotic Exploration of the Solar System

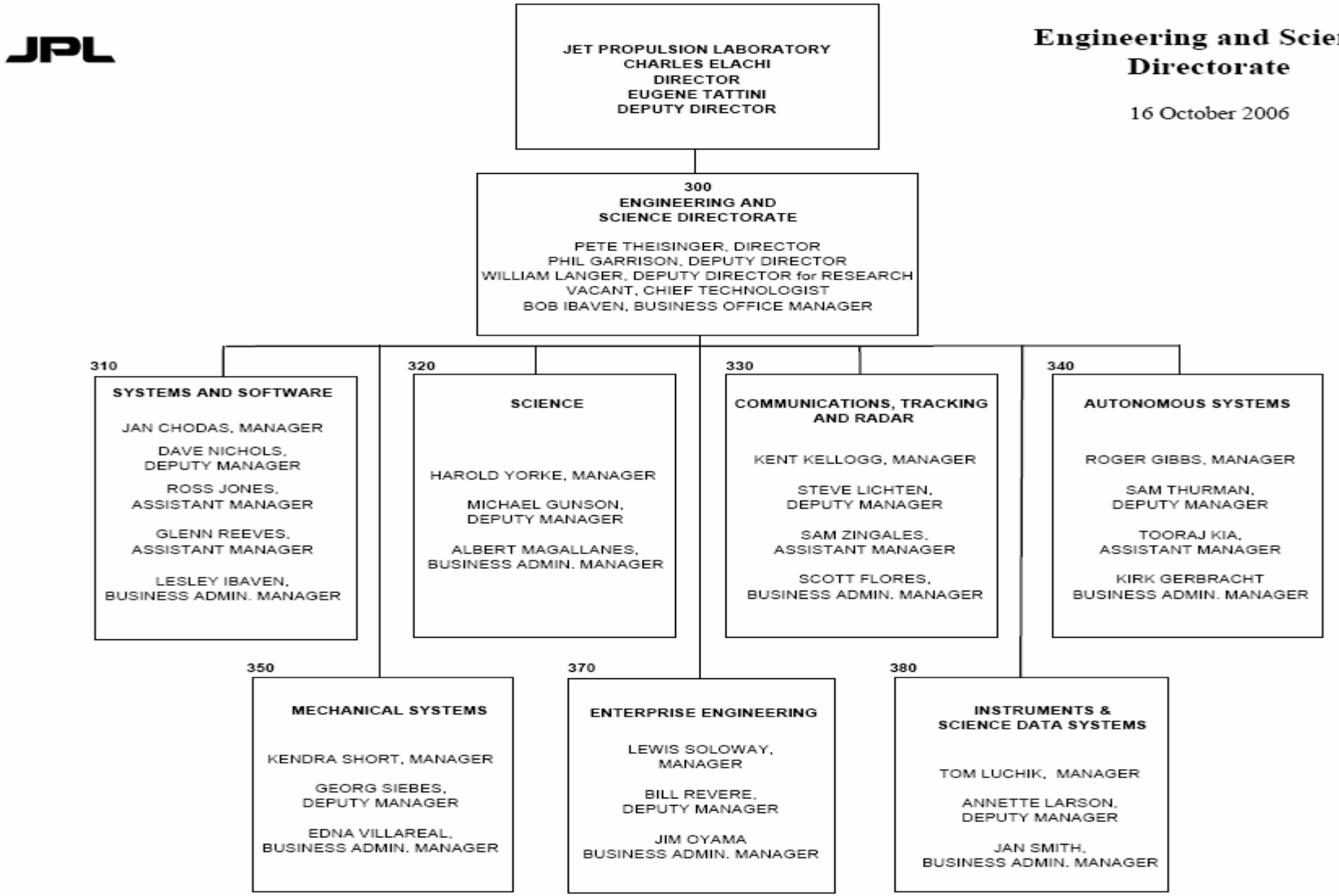
JPL Organizational Breakout



Understanding The Organization

- We are a Matrix Organization
- Project Directorate's (4x 6x 7x 8x 9x) market JPL to the Sponsors and are responsible for obtaining funding
- 3x is our implementing organization. This is where our Design Engineers, Fabrication and hands on development work is accomplished
- Most subcontracts/purchase orders flow through 3x which is the implementing organization for the Project Directorates
- Some large System Subcontracts flow through the Project Directorates. This is where 1 single subcontractor is hired to complete the entire project

Engineering & Science Directorate



Division 31 Systems & Software

- 312 MISSION SYSTEMS CONCEPTS
  - Program System Engineering
  - Mission Architectures
  - Mission Proposal development
  - Project Planning
  - Mission cost estimating
  - Systems Analysis
  - System Engineering tool development
  - Cost risk analysis
  - Launch approval planning
  - Technology development

- 313 SYSTEMS ENGINEERING
  - Mission Engineering & Planning
  - Project Systems Engineering
  - Project Software Systems Engineering
  - End-to-end information systems Engineering
  - Flight Systems Engineering & Architecture
  - Fault Protection
  - Mission Operations Systems Engineering

Division 31 Systems & Software

- 314 SYSTEMS VERIFICATION, VALIDATION & OPERATIONS
  - Flight System Testbed Development & Operations
  - ATLO Development & Operations
  - Launch vehicle Integration
  - Flight System V&V
  - Mission Operations System V&V
  - Integrated Flight/Ground System V&V
  - Flight Operations Training
  - Mission Management during Phase E
  - Mission Control
  - DSN Scheduling

- 315 INTGRATED GROUND DATA SYSTEMS
  - GDS Management & Systems Engineering
  - GDS Software Systems Engineering
  - GDS Integration & Test
  - GDS deployment, management &operations

Division 31 Systems & Software

- 316 FLIGHT SOFTWARE AND DATA SYSTEMS
  - Flight Software Management & Systems Engineering
  - Flight Software Development vis multi mission teams
  - Management and Systems Engineering of tracking, command telemetary & Data Management for Ground software development
  - Flight Software & Ground Software Testbeds

- 317 PLANNING AND EXECUTION SYSTEMS
  - Systems Engineering of planning, scheduling and execution systems
  - Sequence Software development
  - Planning & Scheduling Operations
  - DSN service management systems Engineering
  - DSN service management software development
  - Science Planning Sysetms Engineering

Division 32 Science

- 322 PLANETARY SCIENCE & LIFE DECTECTION
  - Studying the Atmospheres, surfaces and interior of Planets
  - Understanding the origins of planets and the physical processes at work
  - Using Radar to determine the physical characteristics of asteroids and to search for asteroids that may pose a hazard to the Earth
- 324 EARTH SCIENCE
  - Studies of Earth Polar ozone to understand the effects of ozone depletion
  - Measuring and understanding current levels of Atmospheric carbon dioxide and its land & ocean sources and sinks for better climate change predictions
  - Space-based observations and computational models to understand behavior of earthquake fault systems and the processes and impact of volcanic eruptions
- 324 ASTROPHYSICS AND SPACE SCIENCE
  - Astrophysical observations in the optical, infrared, microwave and gravitational wave spectrum
  - Spacecraft observations of the in-situ magnetic field and plasmas
  - Development of new instrumentation for astronomical observations and life detection
  - Laboratory measurement of atomic and molecular cross sections
  - Observations from spacecraft, measurements of the cosmic microwave background, modeling and observation of star formation, proto-stellar disks, and dust disks and new techniques under development for gravitational wave astronomy and for direct observation of extra-solar planets

Division 32 Science

- 328 EARTH REMOTE SENSING
  - Study hurricanes and other aspects of weather from orbiting spacecraft
  - Measuring cloud properties and aerocal particles in the atmosphere & mapping vegated and icy areas
  - Observing stratospheric ozone to characterize depletion and ozone holes
  - Mapping the global distribution of water vapor
  - Mapping tropospheric ozone to study global air quality

Division 33 Communications Tracking & Radar

- 332 COMMUNICATIONS ARCHITECTURES & RESEARCH
  - Coding and Data compression
  - Deep Space Flight and Ground telecom systems Engineering
  - RF, Optical, digital communication systems
  - Telecom mission operations
  - Earth based Planetary Radar and Radio Science
  - Communications networks

- 333 COMMUNICATIONS GROUND SYSTEMS
  - Ground Antenna RF design and Engineering
  - Large Antenna mechanical and structures
  - Cryogenic low noise front-end systems
  - High power transmitter and exciters
  - Telecom digital signal processing

- 334 RADAR SCIENCE AND ENGINEERING
  - Advanced Radar concepts, techniques and technologies
  - Radar system Engineering and Implementation
  - Radar Science applications
  - Radar algorithm development and data processing
  - Mission calibration, validation and operations

Division 33 Communications Tracking & Radar

- 335 TRACKING SYSTEMS & APPLICATIONS
  - Antenna arraying, VLBI and delta – DOR for tracking
  - Precision Clocks and Quantum sensors
  - Autonomous Formation Flying sensors
  - Precision GPS Flight System and Ground Networks
  - Applications to geodesy, geophysics, fundamental physics and astronomy

- 337 FLIGHT COMMUNICATIONS
  - Flight high power/ high voltage electronics
  - Flight Telecom/coherent frequency techniques
  - Flight Antenna research, design, development and characterization
  - Antenna EM scattering, modeling, simulation and metrology

Division 34 Autonomous Systems

- 341 AVIONIC SYSTEMS ENGINEERING
  - Advanced Concepts & Architecture
  - Flight Systems Engineering
  - Test Systems Engineering
  - Integration & Test Engineering
  - Ground System Engineering
  - Multi Mission operations
  - Project Element Managers

- 344 AVIONIC EQUIPMENT
  - Electronic Design
  - Integrated Avionic hardware
  - Precision motion Control & Celestrial sensors
  - Bio-Inspired Technologies & systems
  - Tools and Processes
  - ASIK Design

Division 34 Autonomous Systems

- 345 AUTONOMY & CONTROL
  - Guidance and Control
  - OS and Avionics support software
  - Simulation and Verification
  - Software Systems Engineering & Technology infusion

- 346 POWER AND PRECISION CONVERSION SYSTEMS & TECHNOLOGY
  - Photonics Research & Systems
  - Electro-chemical technologies
  - Materials and Devices technologies
  - Power Electronics Engineering
  - Power System Engineering

Division 34 Autonomous Systems

- 348 MOBILITY SYSTEMS & TECHNOLOGY
  - Machine vision
  - Robotic Vehicles
  - Tele-Robitics research and application
  - Mechanical and Robotic Technologies

- 349 ELECTRONIC PACKAGING AND FABRICATION
  - Fabrication Planning and control
  - Electronic Hardware Fabrication
  - Electronic Packaging Engineering
  - Advanced Electronic Packaging Engineering

Division 35 Mechanical Systems

- 352 SPACECRAFT MECHANICAL ENGINEERING
  - Mechanical Systems & Entry, decent & landing
  - Advanced Mechanical Systems
  - Cabling Engineering
  - Dynamics Environment
  - Mechanical Integration Engineering
  - Spacecraft Design Engineering
  - Spacecraft Structures & Dynamics
  - Bio-technology and Planetary Protection
  - Structures & Configuration

- 353 PROPULSION & MATERIALS
  - Propulsion Flight Systems
  - Advanced Propulsion Technology
  - Flight Materials and processes
  - Materials testing and contamination control
  - Chemical analysis and materials development

Division 35 Mechanical Systems

- 354 THERMAL & CRYOGENICS
  - Advanced optical systems
  - Low Temperature Systems & Technology Development
  - Low Temperature Science & Quantum sensors
  - Advanced Thermal Technology
  - Spacecraft Thermal Engineering & Flight Operations
  - Thermal & Fluid systems Engineering
  - Interferometer thermal Engineering

- 355 INSTRUMENT MECHANICAL ENGINEERING
  - Planetary sample Acquisition & Handling
  - Robotics and Mechanisms
  - Structures & Configuration
  - Opto-Mechanical Engineering
  - Design Engineering
  - Structural Analysis & test
  - Advanced Deployable structures
  - Advanced Technologies

Division 37 Enterprise Engineering

- **The Enterprise Engineering Division** is responsible for the development, operation and management of JPL's enterprise-wide technical infrastructure, which includes:
  - **engineering**, **information technology (IT),**
  - **telecommunication,**
  - **technical facilities.**

- 372 PROJECT CONTROL & ENTERPRISE APPLICATIONS
  - system administration, Configuration Management Engineering (CME), Information Management Engineering (IME), web design and development, database hosting and development, mechanical fabrication,

- 373 ENTERPRISE COMPUTING & NETWORKING
  - email, electronic calendaring, electronic libraries, problem reporting systems, action item tracking systems, project data management systems, mechanical and electrical CAE tools, supercomputers.

Division 37 Enterprise Engineering

- 374 ELECTRONIC PACKAGING & FABRICATION ENGINEERING
  - electrical fabrication, environmental testing, metrology, instrumentation, & the Micro Devices Laboratory
- 375 MECHANICAL FABRICATION & ENGINEERING
  - mechanical fabrication, environmental testing, metrology, and instrumentation.
- 376 MEASUREMENT, INTEGRATION & TEST
  - Spacecraft Test Complex, the Spacecraft Assembly Facility, the 10ft and 24ft Space Simulators, clean rooms

Division 38 Instruments & Science Data Systems

- 382 SPACE EXPERIMENTS SYSTEMS
  - Airborne visible and infrared imaging spectrometer
  - Engineering that supports designs for future instruments
- 383 INTERFEROMETRY AND ADVANCED OPTICAL SYSTEMS
  - Observational approaches, system technologies & architecture
  - Extremely high precision optical modeling technologies and specific component & System Models
  - Multi-functional real-time control soft technologies
  - Extremely high-precision metrology components & systems
  - Adaptive optical technologies and systems for large ground and space based optical observational systems
  - Lidar Technologies and instruments for a range of Scientific & Engineering
- 384 IN-SITU INSTRUMENT SYSTEMS
  - Developing and delivering instrument component technologies that advance the state of the art for observational systems, including detectors, lasers, optics, micro-electro-mechanical systems (mems), fludic devices and nano-structure based devices
  - Developing the micro devices laboratory technical expertise and services for electronic materials, device physics, device fabrication, and device characterization for other sections to support Flight Projects.

Division 38 Instruments & Science Data Systems

- 385 MICROWAVE SYSTEMS
  - Development of quantum-noise limited coherent (heterodyne) and incoherent (direct) detectors for low-background and high-background applications at sub-millimeter & Far infrared wavelengths
  - End-to-end development and field operations of radio meters
  - Development of microwave systems for Earth sensing instruments
  - Semi-conductor device designs, fabrication & qualification
  - Development of advanced techniques to model & design millimeter wave amplifiers and digital circuitry
  - Development of state of the art test and measurement for room temperature and cryogenic microwave, millimeter wave and sub millimeter wave devices, components and subsystems
  - Development of receiver components & observational instrument approaches for cosmic radiation measurements
  - Development of Far Infrared detectors
  - Development of Advanced super computing, devices, thermopile detectors
  - Flight Sensor implementation & testing

Division 38 Instruments & Science Data Systems

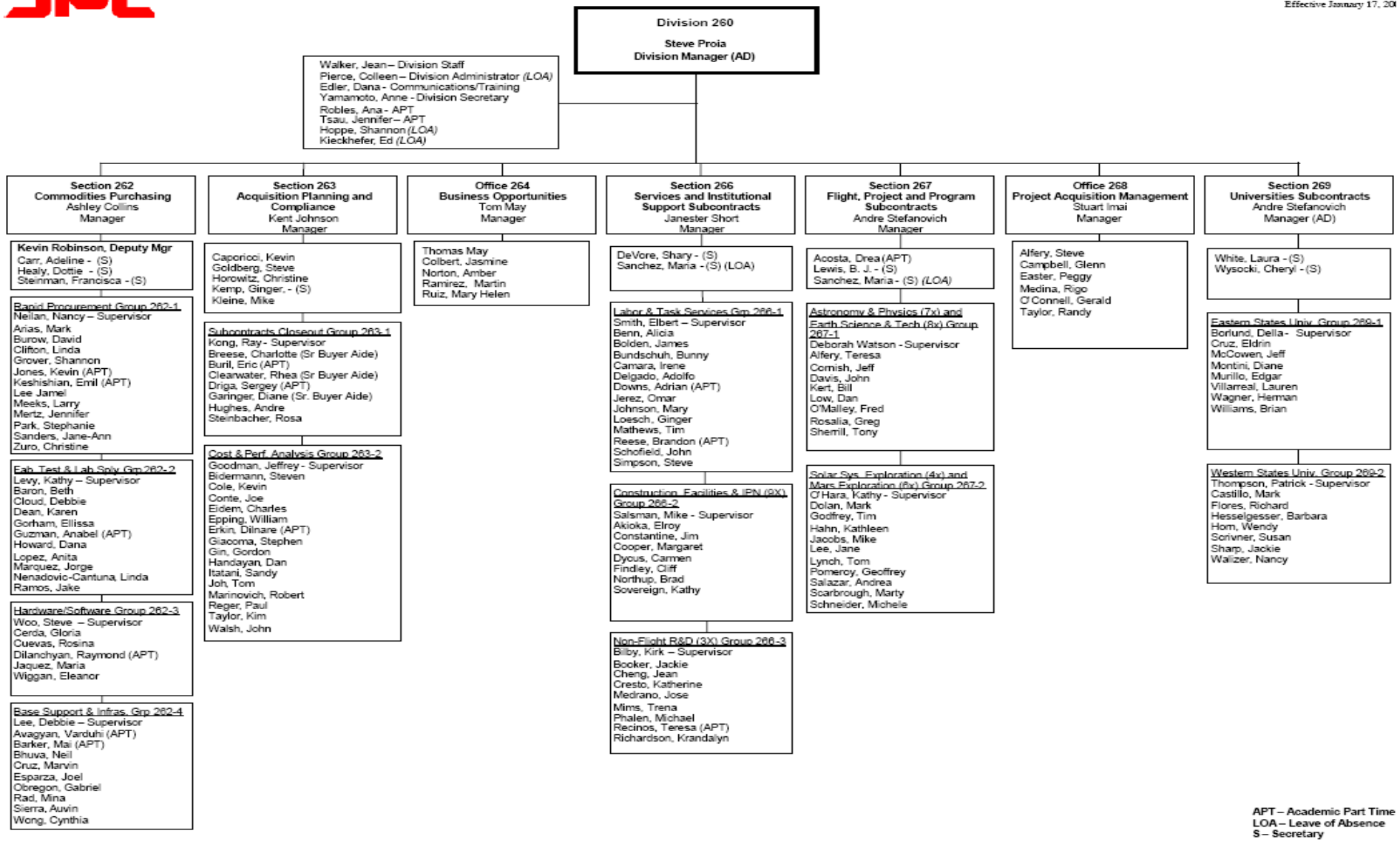
- 386 INSTRUMENT SOFTWARE SYSTEMS
  - Instrument Flight Software, ground data systems development, science operations
  - System Engineering of end-to-end instrument software systems extending through flight, ground sciences, data product generations, data distribution and archiving
  - Design, development, test and integration of instrument real-time embedded Flight Software & ground support equipment
  - Provide and integrate capabilities in automating detecting, identification, correlation and extraction of spatial spectral and temporal characteristics of imaging in support of in-situ technical operations & remote sensing

- 387 MODELING & DATA MANAGEMENT SYSTEMS
  - Earth Science software systems
  - Advanced Information Technology & applications
  - Earth Science Data Management & Archive system
  - Applied cluster computing technology

Who do I contact?

- Find the Technical Supervisor in the area of your expertise
- They are responsible for work assigned in their group supporting the Project Directorates
- They need your help to complete their job.
- Find them, talk to them. Market your specialty/product

Acquisition Organization



Acquisition Buying Sections

- Flight Projects
- Commodities
- Institutional Support & Services
- Universities

Flight Projects

- Spacecraft Systems
- Spacecraft Subsystems
- Flight Instruments
- Technology studies
- Flight R&D Studies and Hardware
- Defense & Intelligence Space Programs
- Technology & Applications programs

Commodities

- Electronic parts
- Mechanical parts
- Build to print components/parts
- Outside fabrication & processing
- Electronic Instrumentation & test equipment
- Electronic components & supplies
- Hardware, software and ADP
- Electrical Supplies
- Graphics products and services
- Office equipment & machines
- Office computer supplies
- Building supplies & hand tools
- Furniture
- Office supplies and associated support
- Small support services
- Flight Parts
- Chemicals, cryogenics, gases

Institutional Support & Services

- Contract Labor support through Labor Hour subcontracts
- Consulting Agreements
- Engineering & Technical Task support subcontracts through blanket basic ordering agreements
- Non-Flight R&D Studies & Hardware
- Ground Support Equipment
- Facilities & Construction
- Maintenance & Operations support of the lab
- Security & fire protection services
- Institutional Computing and Network support
- Desktop computing support
- Interplanetary Network support and services

Universities

- Basic Research
- Scientific Investigations
- Technical studies
- Flight Instruments & Instrumentation
- Educational Outreach
- Not for profit agreements
- Research Support Agreements

How Do you connect with JPL?

- Letters of Interest/Request for Information
- JPL Business Opportunities Home page
- http://acquisition.jpl.nasa.gov/boo/
- Fed Biz Ops home page
- Source list developed by Engineers at JPL
- Source list from Business Opportunities Office o files

How Do you connect with JPL?

- Jet Propulsion Laboratory
  - http://www.jpl.nasa.gov
- JPL Acquisition Division
  - http://acquisition.jpl.nasa.gov/default.htm
- JPL Business Opportunities Office
  - http://acquisition.jpl.nasa.gov/boo
- NASA
  - http://www.nasa.gov

How does JPL buy it?

- Request for Proposal (RFP)
- Can be both competitive/non-Competitive
- Cost proposal received
- If competitive, then a technical evaluation may be performed or
- Mandatory qualifications/low cost
- Either way a “Best Value” determination is made

What can I expect to see in the RFP?

- General Proposal Instructions
- Technical/Management Volume instructions
- Cost instructions
- General request for information about your company its tax payer ID etc…
- Specimen subcontract
  - Fixed Price; Cost Reimbursement; or a variation of the above
  - Incentives including cost; schedule; award fee' award term
- Exhibits including technical information needed to complete the work

How does JPL buy it?

- Request for Quotation (RFQ)
- Can be both competitive and non-competitive
- Price quotation
- Multiple Bids if competitive
- Low Bid wins
- Most common in small purchases or construction

What can I expect to see in the RFQ?

- General instructions on how to respond
- General information request including tax payer ID, type of company (ie sole owner/ corporation) Payment/Shipment Terms; Delivery Terms etc…
- Box to fill in Bid/Price?
- Sample Purchase Order with exhibits or technical data

How does JPL buy it?

- P-Cards
- Commercial Items/Purchase Orders
- Blanket Agreements
- GSA Schedules
- I-Procurement
- Subcontract's utilized at JPL include Fixed Price; Cost Reimbursement; Labor Hour; Time & Material;
- Incentives include Award Fee, Incentive Fee, Award Term

Should I invest my time and money?

- Review and analyze the requirements that JPL has posted
- Determine if there is a fit between my service and JPL needs
- Determine if there are minimum/mandatory requirements and only respond to those solicitations that fit into my core capabilities
- Identify the requirements challenges and research the job. Know the job.
- Attend JPL meetings on the requirements and if possible discuss the requirements in advance with JPL technical staff if the RFP has not yet been posted.

Should I invest my time and money?

- Ask myself the following:
  - Can I do the work?
  - Can I offer a competitive price/cost?
  - Do I have good past performance?
  - Can I meet the schedule?
  - Is this in my core business or am I trying to do everything for everybody?
  - Have I done business with the Government before and if not, do I understand that this is significantly different then commercial business arrangements.
  - Am I prepared to invest the time and B&P money necessary to win this effort?

Tips for a successful proposal

- Read the RFP!
- Read the RFP!
- Establish a proposal team dedicated to winning!
  - Assign Section Leaders responsible for completing their parts including Technical, Management, Cost etc…
  - Review the General/Technical and Management instructions as a team then get to work
- Establish a schedule for
  - completing graphics, printing, reproduction, shipment, revisions, vendor quotes, material lists, internal reviews

Tips for a successful proposal

- Create a compliance matrix list all the requirements in the Statement of Work and Specifications. Answer the following for each item in the matrix
  - Meet
  - Exceed
  - Fail
- Determine where our strengths and weakness fall and be prepared to address
- Create a proposal theme
  - “leading experts; highest reliability; low life cycle cost”

Tips for a successful proposal

- Does my proposal comply with the RFP instructions?
  - Table of contents
  - Address requirements in the right place
  - Comply with page limitations
  - Address what is asked in the RFP
  - Compliance matrix should cross-reference with the WBS/SOW and Specifications.
  - Respond to every question asked in the RFP
  - Avoid deviating from the point or making changes to the requirements

Tips for a successful proposal

- Respond to every instruction and requirement
- Support your assertions with facts and examples if necessary
- Identify key personnel and roles/responsibilities
- Identify areas that make your company better suited to doing the work
- Demonstrate strong past performance
- Propose a strong implementation team
- Include all required information
  - Forms/certifications etc…

Tips for a successful proposal

- Demonstrate the total Best value
  - Best technical approach with the lowest possible overall cost
  - This does not necessary mean the cheapest cost, but the best overall value
- Show solid financial responsibility

Tips for an Unsuccessful proposal

- Deliver your proposal late
- Too expensive
- Critical weaknesses
- Disoriented proposal - unable to track with requirements in the RFP
- Failure to understand what we are buying
- Take exception to requirements
- Failure to comply with requirements

Tips for an Unsuccessful proposal

- Failure to provide all requested information
- Failure to substantiate your assertions
- Place your responses where the evaluators can not find them
- Unrealistic schedules, pricing, or technological advances
- Assume you will get well later
- Don’t take advantage of pre-proposal conferences, or post debriefing process

Summary

- Know your core business capabilities
- Know your customer
- Know how to find your customer
- Respond to your customers needs
- Know who your competition is
- Provide a quality product on time and at a reasonable Cost